SCMAGLEV and Railway Park

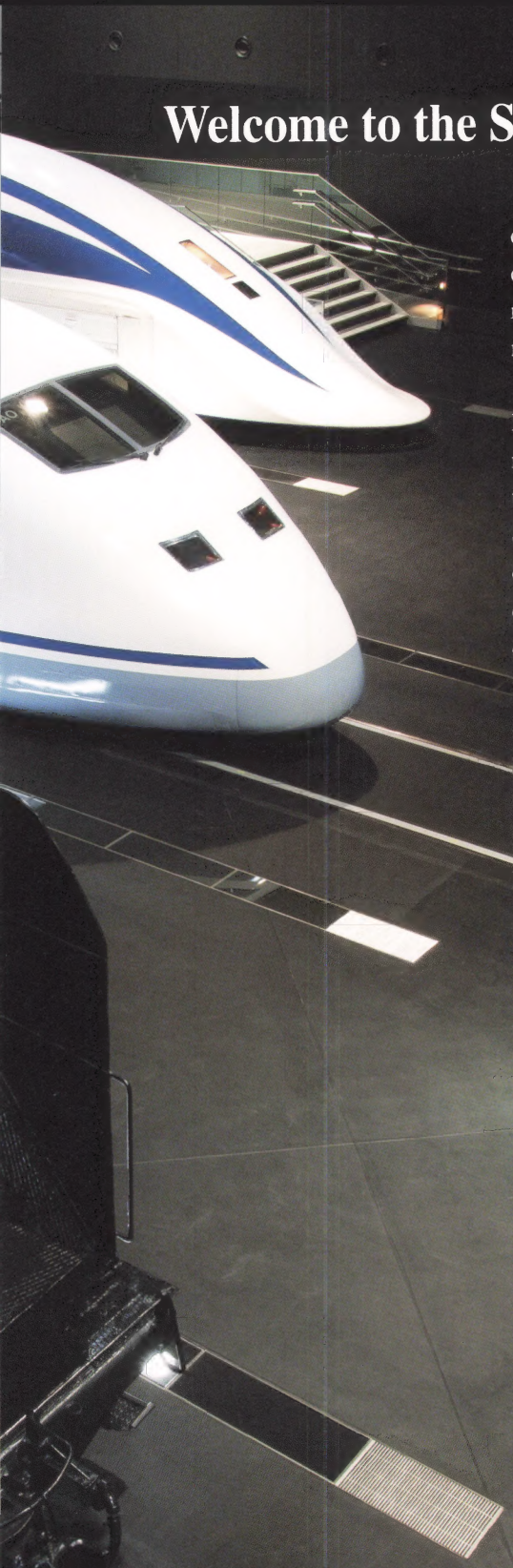
OFFICIAL GUIDEBOOK

ENGLISH〈英語版〉

Welcome to SCMAGLEV and Railway Park


300X
C62 17

Welcome to the SCMAGLEV and Railway Park



Over history, Japan's railway has opened the doors to subsequent generations, changed society, and been a part of people's everyday lives. The Japanese have staked their "dreams" on railway, which has always been ahead of the times, and harbor many life "memories" that are intertwined with railway.

The SCMAGLEV and Railway Park will show you the "gallantry of railway". This powerful and larger-than-life aspect of railway can only be experienced by seeing actual rolling stock that have been operated over the years. At the same time, the SCMAGLEV and Railway Park will also show you a "profile of railway" in that you will be introduced to the technology, design, historical significance, industrial value and background of railway. The rolling stock on display here all represent different eras and have left their mark on Japan's railway history. At each exhibit you will also be introduced to the technologies that have advanced the role of railway in Japan. You may in turn find yourself pondering the wisdom of the architects that made it possible for us to live such rich lives because of railway.

So, what does the SCMAGLEV and Railway Park have in store for you?

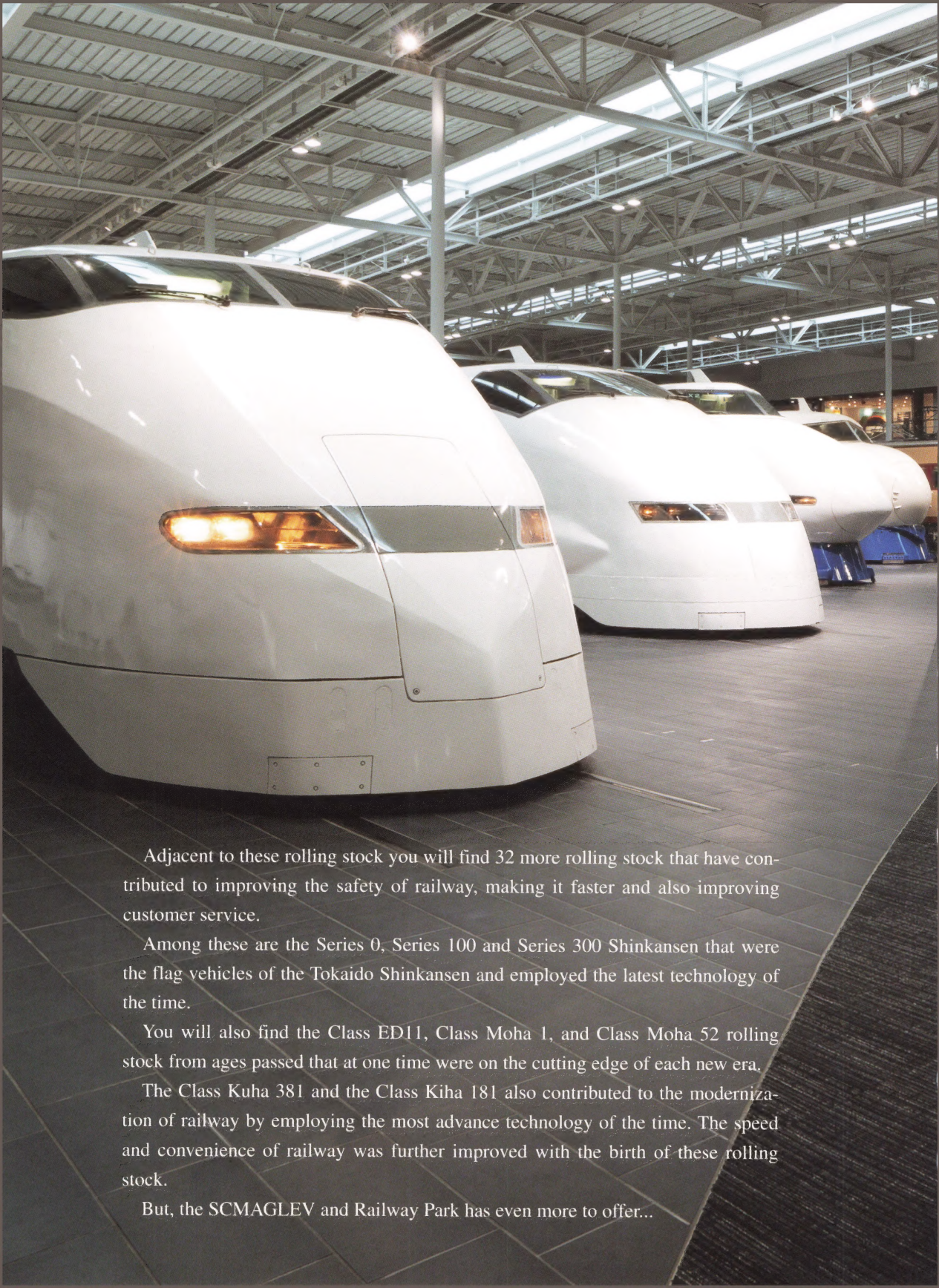
In the Rolling Stock Hall you will find 39 rolling stock from different eras.

Next to the entrance there are three rolling stock that are symbols of high-speed railway in Japan. Each of these rolling stock at one time held the world speed record for railway.

The Class C62 is Japan's largest and fastest steam locomotive. In 1954 (Showa 29) it set the world speed record of 129km/h for narrow gauge steam locomotives.

Next to it is the Class 955 Experimental Shinkansen (300X) which recorded a speed of 443km/h in 1996 (Heisei 8), a world record for electrified trains. This rolling stock was created in pursuit of the most advanced and superior high-speed railway system.

Last is the MLX01-1, a Superconducting Maglev rolling stock that set the world railway speed record of 581km/h in 2003 (Heisei 15).



Adjacent to these rolling stock you will find 32 more rolling stock that have contributed to improving the safety of railway, making it faster and also improving customer service.

Among these are the Series 0, Series 100 and Series 300 Shinkansen that were the flag vehicles of the Tokaido Shinkansen and employed the latest technology of the time.

You will also find the Class ED11, Class Moha 1, and Class Moha 52 rolling stock from ages passed that at one time were on the cutting edge of each new era.

The Class Kuha 381 and the Class Kiha 181 also contributed to the modernization of railway by employing the most advance technology of the time. The speed and convenience of railway was further improved with the birth of these rolling stock.

But, the SCMAGLEV and Railway Park has even more to offer...

In the "Railway System Learning Zone" and "Superconducting Maglev Room" you can see films and models used to introduce the Shinkansen and Superconducting Maglev and learn in an easy-to-understand manner how modern railway works and the role it plays.

The "Shinkansen Train Driving Simulator" faithfully reproduces the Series N700 and allows you to experience driving the Tokaido Shinkansen with an exact reproduction of its driver's cockpit. The conventional train driving simulators reproduce conventional trains, such as the Series 313 and Series 211.

For those of you who want to know what it is like to be a conductor on the Series 313 you can visit the "Conventional Train Crew Simulator". Feel what it is like to be a conductor by opening and closing the doors and making train announcements.

Learn about Japan's railway history in the "Railway History Room" and "Relics Room". The "Railway History Room" introduces railway with emphasis on the Tokaido while the "Relics Room" has various important articles, such as railway parts and tools, on display. These relics testify to the significance of Japan's railway history.

The SCMAGLEV and Railway Park will deepen your knowledge and understanding of Japan's railway history and how railway works through these exhibits.

Guide Map

1F

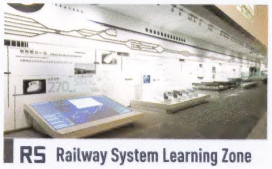
1F Exhibits and Facilities Map

S Superconducting Maglev Room

C Conventional Train Driving Simulator & Train Crew Simulator

N Shinkansen Train Driving Simulator

D Greatest Railway Diorama Room



RS Railway System Learning Zone

MS Museum Shop
(Railway memorabilia and souvenirs available for purchase)

LR Lecture Room

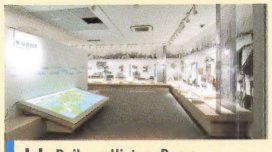
Information | Toilets | Mother and Baby Room | Elevator

2F Exhibits and Facilities Map

K Kid's Playroom*

L Lounge

LE Learning & Experiencing Room



H Railway History Room

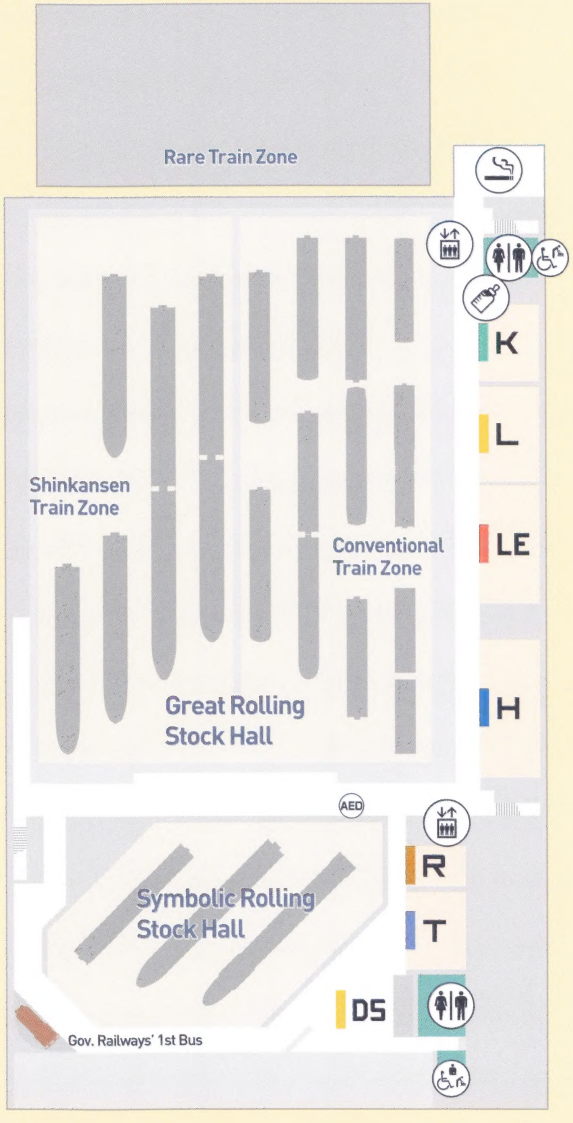
R Relics Room

T Theater

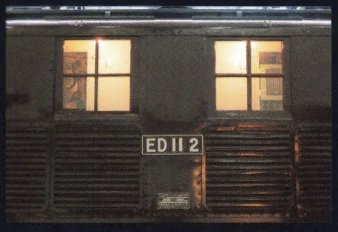
DS DELICA STATION
(Boxed lunches and sandwiches available for purchase)

*The "Kid's Playroom" may only be used by preschoolers when accompanied by a parent or guardian.

2F



Smoking Area | Coin Lockers | Accessible Slope | AED Automated External Defibrillator



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The History of Speed and Japan's Railway ..... 12~13, 18~19, 28~29, 40~42, 52~53

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■ Concept

This museum introduces the "advances in high speed railway" through rolling stock displays, which include the next-generation Superconducting Maglev, as well as the history of railway, among other features.

This park offers a place to learn about how railway has impacted our society, economy, culture and lifestyle.

People of all generations can enjoy learning about railway through the numerous models and simulators.

SCMAGLEV and Railway Park

The History of Tokaido and Railway

Advanced technology that links the 500km distance between Tokyo and Osaka

Train stopped at Shimbashi Station after railway opened

The Class C62 was used to pull limited express trains

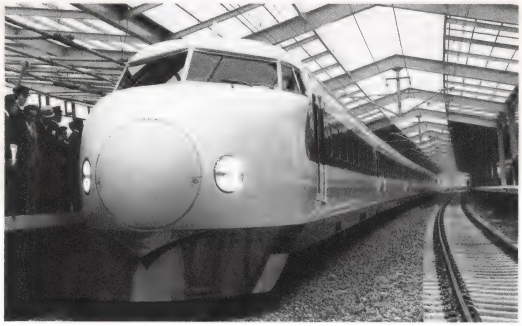
The first railway in Japan was a 29.0km stretch of rail that linked Shimbashi (old Shimbashi station) to Yokohama (presently Sakuragi-cho Station). It opened in 1872 (Meiji 5) using technology that was introduced from the UK. The trip took 53 minutes and the average speed of the railway was approximately 33km/h. A distance that once took an entire day to cover by foot could now be traveled in under an hour. The entire Tokaido Main Line opened in 1889 (Meiji 22). Traveling from one end of the line to the other took approximately 20 hours with the trip from Nagoya to Shimbashi requiring 12 hours 30 minutes, and the trip to Osaka requiring 7 hours and 30 minutes.

The steam locomotive was the main force behind railway from the Meiji Era until the beginning of the Showa Era. The maximum speed of such a railway was under 100km/h but history was forever changed in 1954 (Showa 29) when the Class C62-17 steam locomotive set the world speed record of 129km/h for a narrow gauge steam locomotive during strength tests of bridges.

The end of the 1950's brought the beginning of the age of electrified operation for Japan's railway. The limited express "Kodama" Series 151 that commenced operation between Tokyo and Kobe in 1958 (Showa 33) had a maximum speed of 110km/h. It linked Tokyo and Osaka by 6 hours and 50 minutes thereby enabling railway users to take day trips to either city for the very first time. Then, in July 1959 (Showa 34), the "Kodama Type" Series 151 set a world speed record for narrow gauge railway of 163km/h during a test run.

It was in 1964 (Showa 39) that the Tokaido Shinkansen commenced operation. The Series 0 marked the first

The "Kodama" limited express which made it possible to take day trips between Tokyo and Osaka

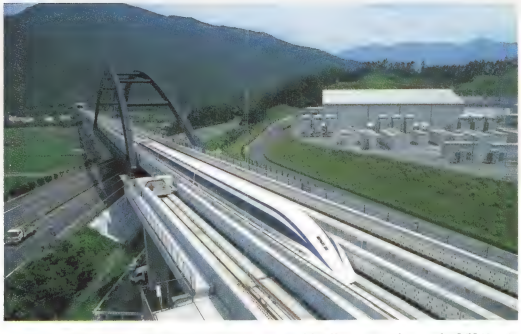


The Tokaido Shinkansen was called the "dream super express" when it first opened

The Class 955 (300X) set an electric train speed record at the time of 443km/h in 1996

train in the world to operate commercially at a speed of 210km/h. Shinkansen rolling stock was further developed thereafter with the birth of the Series 100, and in 1992 (Heisei 4) the Series 300 commenced commercial operation at a maximum speed of 270km/h thereby marking the beginning of a new age for the Shinkansen. In July 1994 (Heisei 6) the Class 955 Shinkansen Test Vehicle (300X), which was developed by JR Central, set a world speed record for trains of 443km/h in July 1996 (Heisei 8).

In December 2003 (Heisei 15) our expectations for the future burned even brighter when the Superconducting Maglev MLX01, which was developed by JR Central and the Railway Technical Research Institute, set a world record of 581km/h.



The Superconducting Maglev MLX01 set a world railway speed record of 581km/h in 2003

■ Speed Development History Timeline

October 14, 1872 (Meiji 5)
Commencement of operation between Shimbashi and Yokohama Trip time: 53 minutes

July 1, 1889 (Meiji 22)
Entire Tokaido Main Line opens. Shimbashi and Kobe linked by 20 hours 5 minutes

June 15, 1912 (Meiji 45)
Limited express service begins between Shimbashi and Shimonoseki

October 1, 1930 (Showa 5)
Super express "Tsubame" commences service between Tokyo and Kobe.
Trip time between Tokyo and Osaka is 8 hours 20 minutes

December 15, 1954 (Showa 29)
Class C62-17 steam locomotive sets 129km/h speed record during bridge strength testing

November 1, 1958 (Showa 33)
Limited express "Kodama" commences service on Tokaido Main Line.
Trip time between Tokyo and Osaka is 6 hours 50 minutes.

March 30, 1963 (Showa 38)
Tokaido Shinkansen prototype (B trainset) sets 256km/h speed record.

October 1, 1964 (Showa 39)
Tokaido Shinkansen commences operation.
Trip time from Tokyo to Shin-Osaka is 4 hours (temporary).
Series 0 max. speed is 200km/h.

November 1, 1965 (Showa 40)
Speed of Tokaido Shinkansen improved.
Trip time between Tokyo and Shin-Osaka is 3 hours 10 minutes. Max. speed is 210km/h.

October 1, 1985 (Showa 60)
Series 100 Shinkansen commences commercial operation

November 1, 1986 (Showa 61)
Max. speed of Tokaido Shinkansen raised to 220km/h.
Trip time from Tokyo to Shin-Osaka is 2 hours 56 minutes.

March 14, 1992 (Heisei 4)
Series 300 Shinkansen rolling stock "Nozomi" commences commercial operation. Trip time from Tokyo to Shin-Osaka is 2 hours 30 minutes. Max. speed is 270km/h. The maximum speed of the Tokaido Shinkansen has remained 270km/h ever since.

July 26, 1996 (Heisei 8)
Class 955 Shinkansen prototype (300X) sets record of 443km/h during test run.

March 13, 1999 (Heisei 11)
Series 700 Shinkansen commences commercial operation

December 2, 2003 (Heisei 15)
Superconducting Maglev MLX01 sets record of 581km/h on Yamanashi Maglev Test Line.

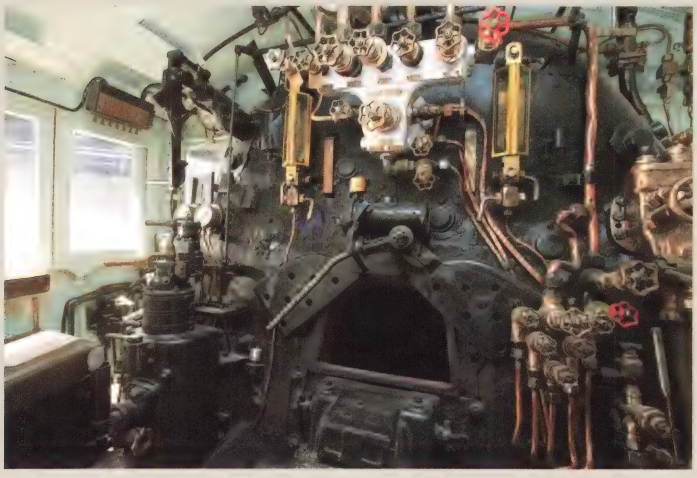
July 1, 2007 (Heisei 19)
Series N700 commences commercial operation. Trip time from Tokyo to Shin-Osaka is 2 hours and 25 minutes.

*The rolling stock on display is shown as it was in 1953 (Showa 28)

Class C62 Steam Locomotive

Maximum Speed: 129km/h

This steam locomotive was the biggest and fastest SL manufactured for the express and super express trains. It employed the boiler from the D52, the biggest steam locomotive for freight. Forty-nine C62 were manufactured. The world high speed record of 129km/h was achieved in 1954 for a steam locomotive on narrow gauge when JNR tested the strength of the Kisogawa bridge.



Car Type	C62 17
Year of Manufacture	1948 (Showa 23)
Manufacturer	Hitachi
Wheel Arrangement	2C2 ●●●●●●●
Total Length	21,475mm
Weight	97.75t

*The rolling stock on display is shown as it was in 2000 (Heisei 12)

300X Shinkansen (Class 955 Experimental Shinkansen)

Maximum Speed: 443km/h

This Shinkansen was introduced by Central Japan Railway Company in 1994 in pursuit of the ultimate in high speed railway systems. Thanks to this experimental train, a lot of informative data about high speed railways was obtained from 600 tests conducted for about seven years. It held the world high speed record for an Electric Multiple Unit of 443km/h.

Car Type	955-6
Year of Manufacture	1994 (Heisei 6)
Manufacturer	Hitachi
Passengers Capacity	-
Total Length	27,150mm
Weight	35.3t

* The rolling stock on display is shown as it was in 1995 (Heisei 7), but the interior is as it was shown during the Aichi Expo 2005.

MLX01-1 Superconducting Magnetically Levitated Vehicle (Maglev)

Maximum Speed: 581km/h

The Superconducting Maglev runs while being levitated by electromagnetic forces created between the coils in the guideways and superconducting magnets on the vehicle. It can run faster than trains due to the absence of friction created when the wheels of trains run on rails. It holds the world high speed record for railway of 581km/h.

Car Type	MLX01-1
Year of Manufacture	1995 (Heisei 7)
Manufacturer	Mitsubishi Heavy Industries
Passengers Capacity	-
Total Length	28,000mm
Weight	Approx. 30t

Rolling stock owned by the Railway Technical Research Institute

SCMAGLEV and Railway Park

Overview of Japan's Railway History [1]

~Pre-WWII Tokaido Main Line~

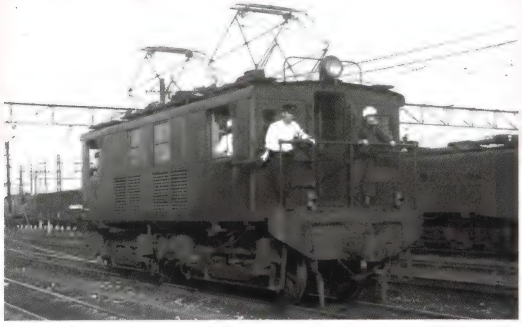
Locomotives imported from the UK were the driving force on the Tokaido Main Line when it opened

The Class C51 that pulled limited express and express trains on lines all over Japan

The Tokaido Main Line is indispensable to modern-day Japan in that it is a main railway artery that links the Tokyo area to the Kansai area. This railway line was opened in 1889 (Meiji 22). The Meiji Government saw railway as the key to a new age and rushed to construct a main line to connect Japan's major cities in the east and west as represented by the linkage of Tokyo and Yokohama with Kyoto, Osaka and Kobe. The Tokaido Main Line was originally intended to pass through Nakasendo, but in order to avoid construction difficulties the route was changed to pass through the Tokaido. Opening of the Tokaido Main Line meant that the trip from Tokyo to Osaka that once took two weeks during the era of the "Fifty-three Stages of the Tokaido" could now be traveled in 20 hours.

The present Taketoyo Line contributed to this construction. In 1886 (Meiji 19) the railway between Taketoyo and Atsuta opened. This was the first railway in Aichi Prefecture and it was used to carry materials that had been shipped by sea to Taketoyo Port.

The Tokaido Main Line was then electrified starting with the Tokyo and Kansai areas. Electrification between Tokyo and Yokohama, and between Yokohama and Kozu was completed in 1914 (Taisho 3) and 1925 (Taisho 14), respectively. The Class Moha 1 was used on the former while the Class ED11 and Class ED17, the predecessor to the Class ED18, were used on the latter. In the Kansai area electrification between Suita and Kobe, and between Suita and Kyoto was completed in 1934 (Showa 9) and 1937 (Showa 12), respectively. The shining star of these sections was the Class Moha 52 which recorded a speed of 119km/h during high-speed test runs between Mishima and Numazu in April 1948 (Showa 23). The data obtained from these tests contributed to improving



The imported Class ED11 that was used on the electrified Tokaido Main Line

The Class Moha 52 took the world by storm with its streamlined appearance

The Class EF58 was the primary electric locomotive used for passenger trains after WWII.

the speed of conventional lines.

In order to strengthen the transport capability of the Tokaido Main Line, plans for the construction of a new line between Tokyo and Shimonoseki and the "Bullet Train Plan" that was to travel at a maximum speed of 200km/h were proposed in 1938 (Showa 13). The rolling stock was designed and construction on a few tunnels near Atami began, but the worsening of WWII brought a halt to the plan.

Electrification of the entire Tokaido Main Line was completed on November 19, 1956 (Showa 31). This brought about the birth of the limited express trains, such as the "Kodama" and the "Asakaze" thereby modernizing Japan's railway.

The "Kodama" was Japan National Railway's first limited express train.

■ Pre-War and Post-War Tokaido Main Line Development Timeline

November 1869 (Meiji 2)
The Meiji Government decides to construct a main railway artery between the cities in the east and west.

October 14, 1872 (Meiji 5)
Railway between Shimbashi and Yokohama opens

March 16, 1882 (Meiji 15)
Rapid-transit trains commence operation. Stops are made at Shinagawa and Kanagawa only

March 1, 1886 (Meiji 19)
Railway between Taketoyo and Atsuta on the Taketoyo Line opens

July 1, 1889 (Meiji 22)
Tokaido Main Line opens between Shimbashi and Kobe

June 15, 1912 (Meiji 45)
Fastest express train commences operation between Tokyo and Shimonoseki (Beginning of limited express train service to follow)

December 20, 1914 (Taisho 3)
Tokyo Station opens. Trains begin operating between Tokyo and Takashima-cho.

December 13, 1925 (Taisho 14)
Electrification between Yokohama and Kozu completed.

September 15, 1929 (Showa 4)
The nickname "Fuji" is given to limited express trains 1 and 2 and "Sakura" to 3 and 4, in operation between Tokyo and Shimonoseki (this marks the beginning of giving nicknames to trains)

1934 (Showa 9)
July 20: Electrification between Suita and Kobe completed
December 1: Tanna Tunnel opens. The conventional line between Kozu and Numazu became the Gotenba Line. Electrification between Kozu and Numazu completed.

1936 (Showa 11)
Class Moha 52 starts operation in Kansai area

October 10, 1937 (Showa 12)
Electrification between Kyoto and Suita completed.

December 1938 (Showa 13)
"Bullet Train Plan" proposed within Japan National Railways

1949 (Showa 24)
February 1: Electrification between Numazu and Shizuoka completed
May 20: Electrification between Shizuoka and Hamamatsu completed

July 21, 1953 (Showa 28)
Electrification between Hamamatsu and Nagoya completed

November 19, 1956 (Showa 31)
Electrification of all lines between Tokyo and Kobe completed.

November 1, 1958 (Showa 33)
Limited express "Kodama" put into service

*This rolling stock on display is shown as it was in 1913 (Taisho 2)

Class Hoji 6005 Steam Passenger Car

This Steam Passenger Car was rare in that it housed both a steam engine and a passenger car. It was used on local lines in the Meiji and Taisho eras. The "Kudo style" of this passenger car enabled easy removal and installation of the steam engine.

■ Car History: Hoji 6014 → Jiha 6006 → Kiha 6401

Car Type	Hoji 6014
Year of Manufacture	1913 (Taisho 2)
Manufacturer	Kisha Seizo
Passengers Capacity	80
Total Length	15,088mm
Weight	23.75t

Railway Monument (designated in 1962 (Showa 37))

Class Ke 90 Steam Locomotive (for light railway)

This steam locomotive was used by a local private railway company between Shin-Tajimi and Hiromi. Its gauge was 762mm. After the local line was nationalized this steam locomotive was used until 1928 when the gauge was widened to 1067mm.

Car Type	Ke 90
Year of Manufacture	1918 (Taisho 7)
Manufacturer	Dai Nippon Kido
Wheel Arrangement	B ●●
Total Length	4,480mm
Weight	6.1t

*This rolling stock on display is shown as it was in 1929 (Showa 4)

Class Moha 1 Electric Railcar

This is a wooden electric railcar introduced in 1921 by the Railways Ministry. It was operated on the Keihin Line and Chuo Line and became the standard for commuter trains. ■ Maximum Speed: 95km/h

■ Car History: Deha 33509 (1922) → Moha 1035 (1928) → De 307 (1938) → Moha 301 (1953)

Car Type	Moha 1035
Year of Manufacture	1922 (Taisho 11)
Manufacturer	Kisha Seizo
Passengers Capacity	104
Total Length	16,790mm
Weight	36.14t

Class ED11 Electric Locomotive

This was one of many electric locomotives imported in 1923 from the U.S.A. in preparation for electrification of the Tokaido Line between Tokyo and Kozu, and the Yokosuka Line. The Japanese Railways Ministry imported ELs as samples since Japanese companies were as yet unable to manufacture them. ■ Maximum Speed:65km/h

Car Type	ED11 2
Year of Manufacture	1922 (Taisho 11)
Manufacturer	General Electric
Wheel Arrangement	B-B ●● ●●
Total Length	11,275mm
Weight	59.6t

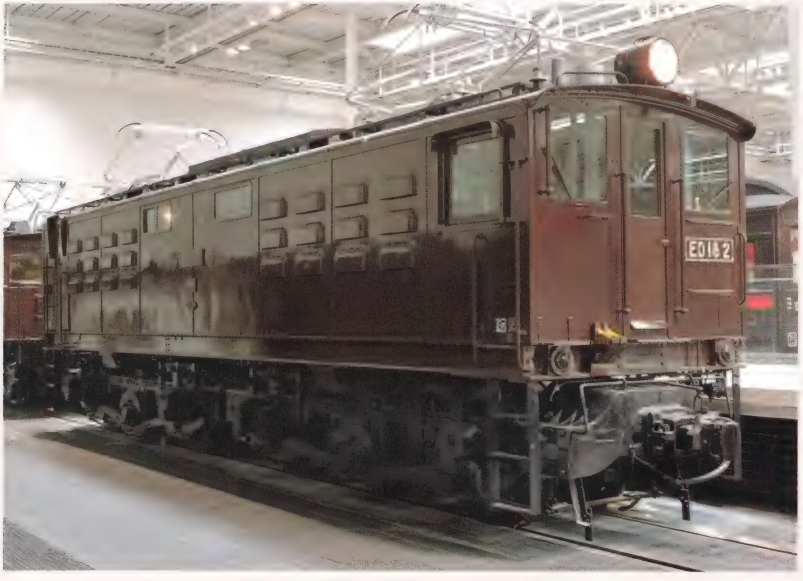
■ Car History: 1011 (1923) → ED11 2 (1928)

*This rolling stock on display is shown as it was in 1960 (Showa 35)

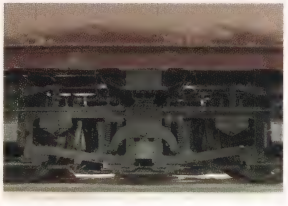
Class ED18 Electric Locomotive

This was one of many electric locomotives imported in 1923 from the UK in preparation for electrification of the Tokaido Line. Additional wheels were installed to reduce axle weight and enable the locomotive to run on local lines like the Iida Line. ■ Maximum Speed: 65km/h

Car Type	ED18 2
Year of Manufacture	1923 (Taisho 12)
Manufacturer	English Electric
Wheel Arrangement	A1A-A1A ●•● ●•●
Total Length	12,400mm
Weight	65.86t



*This rolling stock on display is shown as it was in 1999 (Heisei 11)



*Floating Wheel: A wheel to which power from the motor is not transferred. The floating wheel on the Class ED18 was added to increase the number of wheels thereby distributing the load of the body.

■ Car History: 1055 (1923) → ED 5016 (1928) → ED17 16 (1930) → ED18 2 (1955)

*This rolling stock on display is shown as it was in 1999 (Heisei 11)

Class Kumoha 12 Electric Railcar

This train was originally named the Moha 30, the first steel railcar. It was reconstructed later to have two cabs and rebuilt many times after it was used on Keihin Line.
The Kumoha 12041 was rebuilt after being used as a shunting car.

■ Maximum Speed: 95km/h

■ Car History: Deha 73331(1927) → Moha 30131(1928) → Moha 11047(1953) → Moha 10016(1954) → Kumoya 22112(1964) → Kumoha 12041(1987)

Car Type	Kumoha 12041
Year of Manufacture	1927 (Showa 2)
Manufacturer	Kisha Seizo
Passengers Capacity	102
Total Length	17,000mm
Weight	38.8t

Class Suni 30 Baggage Car

This baggage car is made of steel. The steel was used for Oha 31 passenger car group which Suni 30 belongs to in order to reinforce the car body around the beginning of the Showa Era (1927).

Car Type	Suni 30 95
Year of Manufacture	1929 (Showa 4)
Manufacturer	Osaka Tekkou
Passengers Capacity	-
Total Length	17,000mm
Weight	27.64t

■ Car History: Suni 36660 (1929) → Suni 30 95 (1941) → Sue 30 8(1961)

*This rolling stock on display is shown as it was in 1958 (Showa 33)

Class Oya 31 Structure Gauging Train

This train was called the "Structure Gauging Train". It was rebuilt from a passenger car to detect obstacles while running. It was a remodeled version of the Suha 32 passenger car.

Car Type	Oya 31 12
Year of Manufacture	1937 (Showa 12)
Manufacturer	Tanaka Sharyo Kojo (presently Kinki Sharyo)
Passengers Capacity	-
Total Length	20,060mm
Weight	31.9t

■ Car History: Suha 33089 (1937) → Suha 32 246(1941) → Oya 31 12(1959)

*This rolling stock on display is shown as it was in 1989 (Heisei 0)

Class Moha 52 Electric Railcar

This train was the leading car of an express train in the Kansai district. Twelve cars were manufactured between 1936 and 1937.
It is streamlined and was nicknamed the "Ryu-den" which means "streamlined electric rail car". It had a bright two-toned color. The impressive design and color gained wide attention thereby altering the image of electric rail cars.
In later years, it was used on the Iida Line. ■ Maximum Speed: 95km/h

*This rolling stock on display is shown as it was in 1937 (Showa 12)

Car Type	Moha 52004
Year of Manufacture	1937 (Showa 12)
Manufacturer	Kawasaki Sharyo
Passengers Capacity	134
Total Length	20,000mm
Weight	47.9t

■ Car History: Moha 52004(1937) → Kumoha 52004(1959)

Class Oha 35 Passenger Car

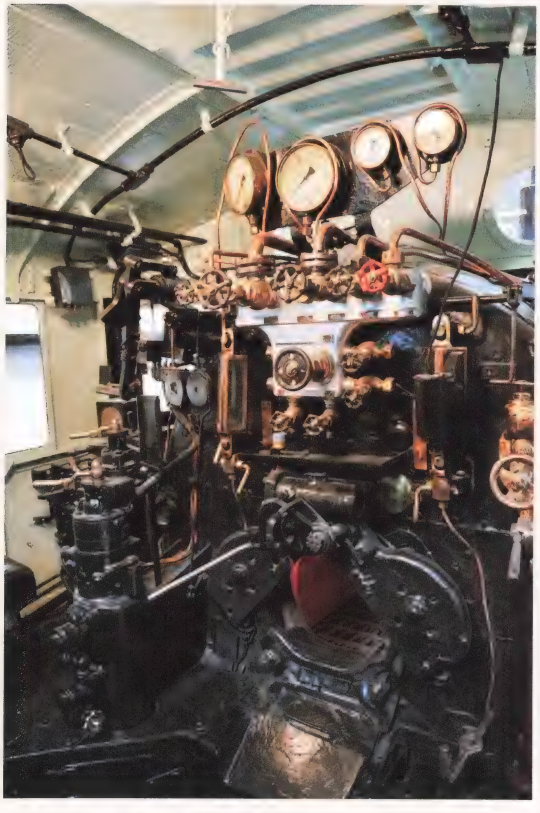
This was a 3rd class passenger car made of steel during WW II that became the standard model for steel passenger cars. Its meter long windows were well reputed.

*This rolling stock on display is shown as it was in 1942 (Showa 17)

Car Type	Oha 35 206
Year of Manufacture	1941 (Showa 16)
Manufacturer	Nippon Sharyo
Passengers Capacity	88
Total Length	20,000mm
Weight	31.15t

■ Car History: Suha 33855(1941) → Oha 35 206 (1942) → Oha 35 2206(1962)

*This rolling stock on display is shown as it was in 1964 (Showa 39)



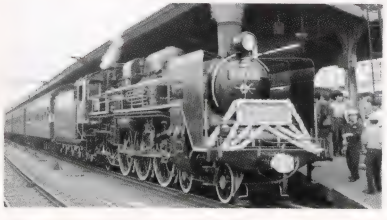
Class C57 Steam Locomotive

This was one of many steam locomotives manufactured for use on main lines. 201 C57s were manufactured beginning in 1937.

Although it was midsize, this locomotive featured great performance due to improved wheels and boilers, and it was easy to operate. The beautiful proportions of this locomotive with its big wheels and slender boiler make it popular among railway enthusiasts.

Car Type	C57 139
Year of Manufacture	1940 (Showa 15)
Manufacturer	Mitsubishi Heavy Industries
Wheel Arrangement	2C1 ●●●●●
Total Length	20,280mm
Weight	79.7t

■ Maximum Speed: 100km/h



SCMAGLEV and Railway Park

Overview of Japan's Railway History [2]

~Increasing the speed of conventional lines post-WWII~

"Heiwa", the first limited express train post-WWII

JNR trains entered the age of long distance operation with the birth of the Series 80 "Shonan Train"

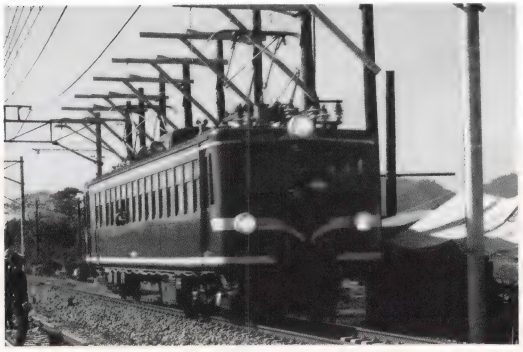
In August 1945 (Showa 20) World War II came to an end and Japanese society embarked on a new journey. Due to the loss of many rolling stock from Allied bombings, the railway industry began mass production of the Class Moha 63, which was designed during the war, thereby saving post-war railway from confusion.

In 1956 (Showa 31) after the wounds of war had healed, electrification of the entire Tokaido Main Line was completed. The driving forces for the Tokaido Main Line at this time were the passenger limited express trains "Tsubame" and "Hato", which were towed by the Class EF58 electric locomotive that had been mass produced after the war. The Class EF58 stayed in service long after and became the electric locomotive most associated with post-WWII Japan.

1957 (Showa 32) saw the birth of the Class Moha 90 (later the Series 101). Later referred to as "New Performance Trains", the Class Moha 90 employed new innovations, such as the Cardan driving mechanism. In the following year the "Kodama" (Series 20 at time of birth, later the Series 151 and Series 181) limited express train and the Series 91 (later the Series 153) express, both with Cardan driving mechanisms, were born thereby welcoming Japan's railway into the age of high-speed. It was in 1962 (Showa 37) that the Series 111, a new performance train intended for medium-distance transport, was born. The appearance of the Series 111 meant that old rolling stock left for medium-distance passenger transport could now be replaced, thereby realizing improvements in passenger service as well as operational

The Class Moha 90 (later the Series 101) appeared with a modern look

The Series 111 contributed to improvements in medium-distance transport service

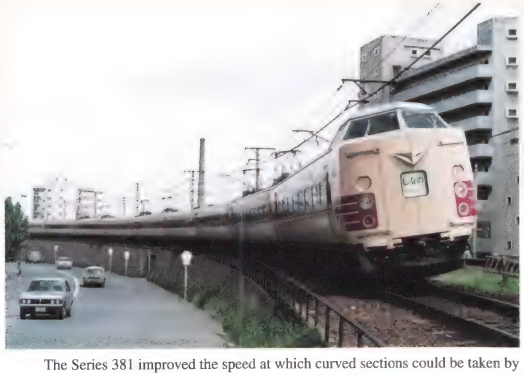


The Class Kumoya 93 recorded a speed of 175km/h during high-speed test runs.

speed.

Then, in 1973 (Showa 48) improvements to speed on curved sections were made with the employment of the car tilting system on the Series 381 limited express. This largely contributed to the expediency of trains that ran on hilly lines. High-speed tests with the Series 381 were conducted in 1984 (Showa 59) and the year after. During a high-speed test conducted in 1985 (Showa 60) the Series 381 recorded a speed of 179.5km/h.

The current maximum speed on conventional lines of 160km/h is made possible by keeping rail lines as straight as possible, much like the Shinkansen, and doing away with level crossings by building overhead passes. The high-speed operation know-how cultivated through the Tokaido Shinkansen is leveraged in this way.



The Series 381 improved the speed at which curved sections could be taken by employing a "car tilting system".

■ History Timeline of post-WWII Development of High Speed Conventional Lines

August 15, 1945 (Showa 20)
World War II comes to an end

April 1948 (Showa 23)
Class Moha 52 records maximum speed of 119km/h during high-speed test runs between Mishima and Numazu on the Tokaido Main Line

September 15, 1949 (Showa 24)
Operation of the "Heiwa" limited express commences between Tokyo and Osaka. Trip time: 9 hours. This marks the rebirth of limited express service that had stopped during WWII.

March 1, 1950 (Showa 25)
Commencement of operation between Tokyo and Numazu of the "Shonan Train" that used the Series 80 (This marked the beginning of long-distance operation by JNR)

December 14~15, 1955 (Showa 30)
Implementation of high-speed test runs between Tokyo and Maibara of passenger cars pulled by Class EH10 electric locomotives.

November 19, 1956 (Showa 31)
Electrification of Tokaido Main Line completed

1957 (Showa 32)
October 25: High-speed test runs implemented between Chigasaki and Hiratsuka using the Class Moha 90 (later the Series 101). 135km/h recorded.
November 14: High-speed long-distance test runs implemented between Hamamatsu and Maibara using the Class Moha 90. 128km/h recorded.
December 16: Commercial operation of Class Moha 90 commences. This will be JNR's first new performance train.

November 1, 1958 (Showa 33)
Commencement of operation of the "Kodama" limited express on the Tokaido Main Line. Max. speed: 110km/h. Trip time between Tokyo and Shin-Osaka: 6 hours 50 minutes.

July 31, 1959 (Showa 34)
Series 151 records speed of 163km/h during high-speed test run between Kanaya and Yaizu.

November 21, 1960 (Showa 35)
Class Kumoya 93 records speed of 175km/h during high-speed test runs between Shimada and Fujieda.

1962 (Showa 37)
Series 111 new performance suburban train commences operation

October 1, 1973 (Showa 48)
Commencement of operation of JNR's first car-tilting Series 381 for commercial use.

November 26, 1985 (Showa 60)
Series 381 records speed of 179.5km/h during high-speed test runs on the Kosei Line

Class Moha 63 Electric Railcar

This was a commuter train used during WW II. It was simply designed to reduce costs. A fire on the same type of train killed 106 people at Sakuragicho station in Yokohama. This disaster spurred improvements in fire safety measures for trains.

■ Maximum Speed: 95km/h

*This rolling stock on display is shown as it was in 1947 (Showa 22)

Car Type	Moha 63638
Year of Manufacture	1947 (Showa 22)
Manufacturer	Kawasaki Sharyo
Passengers Capacity	159
Total Length	20,000mm
Weight	44.47t

■ Car History: Moha 63638(1947) → Moha 72258 (1952) → Kumoya 90005(1967)

Class Maine 40 Sleeping Car

This was a 1st class sleeping car designed after WW II.
It was called the "Pullman type" because the beds were located parallel with the rails. It also had four compartments and was used as a night express train from Tokyo to Kyushu.

■ Car History: Maine 40 7(1948) → Marone 40 7 (1955) → Oya 41 2(1968)

Car Type	Maine 40 7
Year of Manufacture	1948 (Showa 23)
Manufacturer	Nippon Sharyo
Passengers Capacity	22
Total Length	20,000mm
Weight	44.5t

*This rolling stock on display is shown as it was in 1955 (Showa 30). (Body configuration is that of a Class Marone 40)

Class Kiha 48000 Diesel Railcar

This is a train Kiha 45000 group which could be operated as multiple units. Multiple unit operation dramatically increased the transport of local lines.

■ Maximum Speed: 95km/h

■ Car History: Kiha 48036(1956) → Kiha 11 26 (1957) → Kiha 113(1980)

*This rolling stock on display is shown as it was in 1956 (Showa 31). The lavatory has been removed.

Car Type	Kiha 48036
Year of Manufacture	1956 (Showa 31)
Manufacturer	Tokyu Car Corporation
Passengers Capacity	108
Total Length	20,000mm
Weight	31.5t

Class Orone 10 Sleeping Car

This was a 1st class sleeping car manufactured in 1955. The design was based on European passenger cars. It had a light weight body and the ride comfort was well reputed thanks to the air suspension on the bogies.

Car Type	Orone 10 27
Year of Manufacture	1960 (Showa 35)
Manufacturer	Hitachi
Passengers Capacity	28
Total Length	20,500mm
Weight	32.5t

■ Car History: Orone 10 27(1960) → Oya 10 2(1975)

*This rolling stock on display is shown as it was in 1960 (Showa 35)

*This rolling stock on display is shown as it was in 1958 (Showa 33)

Class EF58 Electric Locomotive

This electric locomotive was used for passenger trains. 172 of EF58 were manufactured.
It introduced streamlined bodies and was used for a super express train. This train became an EL star.
The Tsubame and Hato were hauled by an EF58 when the Tokaido Line was fully electrified.

■ Maximum Speed: 100km/h

Car Type	EF58 157
Year of Manufacture	1958 (Showa 33)
Manufacturer	Mitsubishi Electric (Currently Mitsubishi Heavy Industries)
Wheel Arrangement	2C-C2 ●●●● ●●●●●●
Total Length	19,900mm
Weight	115.0t

*This rolling stock on display is shown as it was in 1963 (Showa 38).
The interior of this rolling stock has been refurbished to appear as it was in 1964 (Showa 39) after it was modernized.

Class Suha 43 Passenger Car

■ Car History: Suha 43 321(1954) → Oha 47 98(1963) → Oha 47 2098(1964)

This car was designed after WW II to be much more comfortable. Seat pitch was increased by 15mm and cabin lights were placed not in one row but two. The seats featured arm rests and head rests and this train was used for the Tsubame Super Express.

Car Type	Suha 43 321
Year of Manufacture	1954 (Showa 29)
Manufacturer	Niigata Tekko
Passengers Capacity	88
Total Length	20,000mm
Weight	33.0t

*This rolling stock on display is shown as it was in 1982 (Showa 57)

Class Kuha 111 Electric Railcar

This train was one of the "new performance electric railcar group".
New performance electric railcars made less noise thanks to a Cardan driving device. This train was designed for suburban service.
It was put into operation in 1962.

■ Maximum Speed: 100km/h

Car Type	Kuha 111-1
Year of Manufacture	1962 (Showa 37)
Manufacturer	Nippon Sharyo
Passengers Capacity	116
Total Length	20,000mm
Weight	29.6t

Class Kumoha 165 Electric Railcar

This was the leading car of the Series 165 express train. It was developed for lines with many inclines based on the Series 153. It was used on the Shinetsu Line, Joetsu Line and Chuo line.

■ Maximum Speed: 110km/h

*This rolling stock on display is shown as it was in 1997 (Heisei 9)

Car Type	Kumoha 165-108
Year of Manufacture	1966 (Showa 41)
Manufacturer	Tokyu Car Corporation
Passengers Capacity	76
Total Length	20,400mm
Weight	39.8t

Class Saro 165 Electric Railcar

This train was the 1st class car of the Series 165 express trains. It had reclining seats and big windows thereby offering great comfort. It housed a small driving cab for shunting.

■ Maximum Speed: 110km/h

Car Type	Saro 165-106
Year of Manufacture	1967 (Showa 42)
Manufacturer	Teikoku Sharyo Kogyo
Passengers Capacity	48
Total Length	20,000mm
Weight	32.8t

*This rolling stock on display is shown as it was in 1978 (Showa 53)

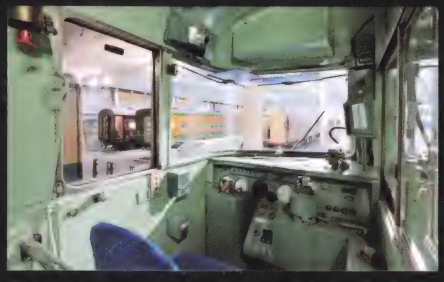
Class Kiha 82 Diesel Railcar

This was the leading car of the Series Kiha 82 super express diesel car. It was reliable and comfortable and used on Japanese non-electrified lines. The sophisticated design affected many trains in Japan.

■ Maximum Speed: 100km/h

*This rolling stock on display is shown as it was in 1987 (Showa 62)

Car Type	Kiha 82 73
Year of Manufacture	1965 (Showa 40)
Manufacturer	Nippon Sharyo
Passengers Capacity	52
Total Length	21,100mm
Weight	43.9t



Class Kiha 181 Diesel Railcar

This train was the leading car of the Series 181 super express diesel car. 158 cars were manufactured. It had a new 500 PS engine which enabled high speed operation in mountainous areas.

This car changed the image of super express diesel trains running in mountainous areas. It debuted as the Shinano Super Express and ran all across Japan with the exception of Hokkaido.

■ Maximum Speed: 120km/h

Car Type	Kiha 181-1
Year of Manufacture	1968 (Showa 43)
Manufacturer	Fuji Heavy Industries
Passengers Capacity	52
Total Length	21,300mm
Weight	44.6t

*This rolling stock on display is shown as it was in 1982 (Showa 57). The interior is shown as it was in 1994 (Heisei 6)

Class Kuha 381 Electric Railcar

This train was the first super express electric car equipped with a tilting system that enabled it to run on curves smoothly at a higher speed.

It debuted in 1973 as the Shinano Super Express between Nagoya and Nagano. It could take curves at 25km/h faster than existing trains.

■ Maximum Speed: 120km/h

*This rolling stock on display is shown as it was in 1995 (Heisei 7)

Car Type	Kuha 381-1
Year of Manufacture	1973 (Showa 48)
Manufacturer	Kawasaki Heavy Industries
Passengers Capacity	60
Total Length	21,300mm
Weight	34.0t

Class Kuro 381 Electric Railcar

This was called a "panorama car". Some middle cars of the Series 381 were fully remodeled into a leading car with a better view to make the Shinano Express more popular.

■ Maximum Speed: 120km/h

■ Car History: Saro381-6(1974) → Kuro381-11(1988)

*This rolling stock on display is shown as it was in 1992 (Heisei 4)

Car Type	Kuro 381-11
Year of Manufacture	1974 (Showa 49)
Date Renovated	1988 (Showa 63)
Manufacturer	Kawasaki Heavy Industries
Passengers Capacity	44
Total Length	22,105mm
Weight	38.0t

Series 117 Electric Multiple Unit

The Series 117 was operated in the Kansai area in 1980 and became popular for its great comfort. It was nicknamed the "City Liner" in the Kansai area. The Series 117 was operated in 1982 around Nagoya and nicknamed the "Tokai Liner".

■ Maximum Speed: 110km/h

*The color of this rolling stock on display is the same as when originally manufactured.

Car Type	Kuha 117-30	Moha 117-59	Kuha 117-209
Year of Manufacture	1982 (Showa 57)	1982 (Showa 57)	1986 (Showa 61)
Manufacturer	Kinki Sharyo	Kinki Sharyo	Nippon Sharyo
Passengers Capacity	102	112	105
Total Length	20,280mm	20,000mm	20,280mm
Weight	36.3t	43.7t	30.8t

Government Railway's first Bus

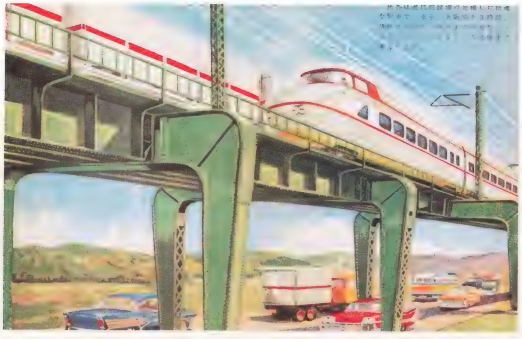
This was the 1st bus operated by Government Railways.
It ran between Okazaki and Tajimi, and between Kozoji and Seto-Kinenbashi. Japanese companies were nominated as manufacturers in order to develop Japanese industry however most buses in Japan were foreign-made.

Year of Manufacture	1930 (Showa 5)
Manufacturer	Tokyo Gas Electric Engineering
Passengers Capacity	20
Total Length	6,265mm

SCMAGLEV and Railway Park

Shinkansen Pre-History [1]

~From Concept to Conception~



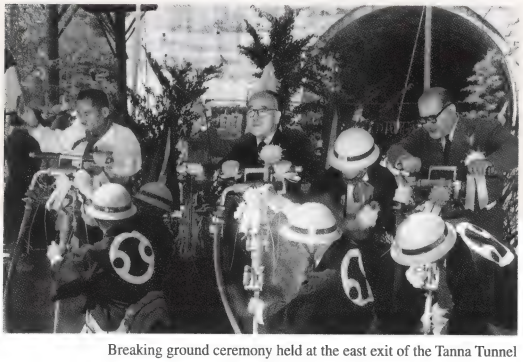
Plans for the Tokaido Shinkansen included a futuristic body design and freight train operation

A lecture by the Railway Technical Research Institute with a packed audience (May 1957, Yamaha Hall, Ginza)

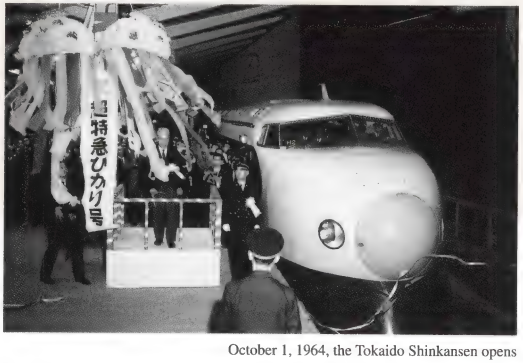
It was prior to WWII that the dream-like plan to "construct a new type of line parallel to the Tokaido Main Line that could operate at high-speed" was proposed in the form of the "Bullet Train Plan". However, this plan was cancelled due to the escalating hostilities.

When Japan entered its period of rapid economic growth in the post-war years, the Tokaido Main Line faced a chronic lack of transport capability that screamed for the construction of a new line.

In May 1957 (Showa 32) a lecture entitled "The Possibility of Traveling from Tokyo to Osaka in 3 Hours" was held at the Railway Technical Research Institute which spurred the then president of the Japan National Railways (JNR), Shinji Sogo, to start construction of a new broad gauge railway line. It is said that there was much opposition to this plan within JNR, but Sogo invited Hideo Shima, who had been away from JNR despite being a skilled engineer that designed the Class D51 and Class C62 steam locomotives, to run the Engineering Department and persuaded the opposition to go forward with the Shinkansen construction plan. This new railway that would link Tokyo to Osaka in three hours, the Tokaido Shinkansen, was affectionately named the "Dream Super Express". Construction began in 1959 (Showa 34) and the Tokaido Shinkansen commenced operation on October 1, 1964 (Showa 39), right before the Tokyo Olympic Games.



Breaking ground ceremony held at the east exit of the Tanna Tunnel



October 1, 1964, the Tokaido Shinkansen opens

The History of the Shinkansen [2]

~From Inauguration to the Eve of the Establishment of JR~

The Shinkansen became a new artery of the Tokaido

Many guests of state rode the Tokaido Shinkansen
(President of Mexico José López Portillo y Pacheco: 1978)

The Tokaido Shinkansen operated at a maximum speed of 210km/h, the fastest of any train in the world at the time, and linked Tokyo to Shin-Osaka in 3 hours and 10 minutes (however, maximum speed during the first year after inauguration was restricted to 200km/h to allow the tracks to settle so the trip from Tokyo to Shin-Osaka by "Hikari" took 4 hours).

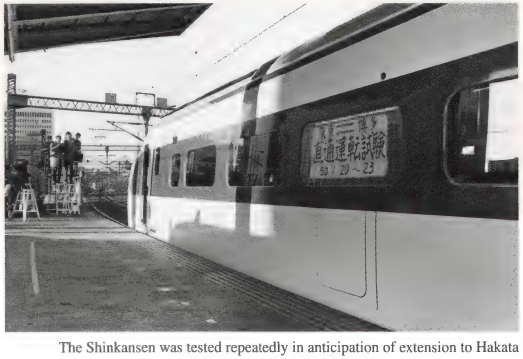
Immediately after inauguration the Tokaido Shinkansen offered overwhelming transport capability and grew into a large transportation artery that would support Japanese economy from its roots. This success overturned world opinion that "railway was a decaying industry" and led to the networks of high-speed railway that we see in the world's prominent nations today.

The Shinkansen was extended to Okayama in 1972 (Showa 47) and then to Hakata in 1975 (Showa 50), and conventional line limited expresses were connected to the Shinkansen at major stations thereby establishing the modern operational network that currently exists.

In 1985 (Showa 60) the Series 100, the successor to the Series 0 that had continued to be manufactured since inauguration of the Tokaido Shinkansen, was born. This series had a double-deck car in its trainset and was popular for its superior comfort and variety of services.

In 1982 (Showa 57) the Tohoku and Joetsu Shinkansen opened thereby extending Japan's high-speed railway network north of Tokyo. Japan National Railways was broken apart and privatized in 1987 (Showa 62) resulting in the birth of JR.

In 1972 the Shinkansen was extended to Okayama



The Shinkansen was tested repeatedly in anticipation of extension to Hakata

The History of the Shinkansen [3]

~From Establishment of JR Central to Present~

The Shinkansen entered a new era with the birth of the Series 300 "Nozomi"

After the birth of JR, the Tokaido, Sanyo and Tohoku/Joetsu Shinkansens were put under the control of JR Central, JR West and JR East, respectively.

In 1990 (Heisei 2) the 3rd generation of Tokaido Shinkansen, the Series 300, was born. Mass production started in 1992 (Heisei 4) and the "Nozomi" commenced commercial operation in March of the same year.

The Series 0, which had been in service since the inauguration of the Tokaido Shinkansen, was retired in 1999 (Heisei 11). In the same year, the 4th generation Series 700 appeared, and 2007 (Heisei 19) saw the appearance of the 5th generation Tokaido Shinkansen, the Series N700. New rolling stock has been introduced on other Shinkansen lines as well and new lines have opened thereby continuing the generational shift.

With its speed and comfort the Series N700 is the current driving force of the Shinkansen

■ History Timeline for Tokaido Shinkansen Construction and Rolling Stock

December 1938 (Showa 13)
"Bullet Train Plan" proposed within JNR

May 30, 1957 (Showa 32)
Lecture entitled "The Possibility of Traveling from Tokyo to Osaka in 3 Hours" is held by the Railway Technical Research Institute in Ginza, Tokyo and gets much attention

December 19, 1958 (Showa 33)
The Tokaido Shinkansen construction plan is approved

April 20, 1959 (Showa 34)
Breaking ground ceremony held at east exit of new Tanna Tunnel

October 1, 1964 (Showa 39)
Tokaido Shinkansen opens between Tokyo and Shin-Osaka

March 15, 1972 (Showa 47)
Tokaido Shinkansen extended to Okayama as the Sanyo Shinkansen

March 10, 1975 (Showa 50)
Tokaido Shinkansen extended to Hakata as the Sanyo Shinkansen

October 1, 1985 (Showa 60)
Commercial operation of the Series 100 commences on Tokaido and Sanyo Shinkansen

1990 (Heisei 2)
Series 300 Shinkansen prototype completed. Test operation commences.

March 14, 1992 (Heisei 4)
Commercial operation of the Series 300 commences

March 13, 1999 (Heisei 11)
Commercial operation of the Series 700 commences

July 1, 2007 (Heisei 19)
Commercial operation of the Series N700 commences

*This rolling stock on display is shown as it was in 1971 (Showa 46)

Series 0 Shinkansen (Class 21)

This train is the leading car of the Series 0, the very first Shinkansen train, which commenced operation in 1964. When commercial operation began it operated at 210km/h but operational speed was increased to 220km/h thereafter. It took 3 hours and 10 minutes to travel between Tokyo and Osaka. 3,216 Series 0 cars were manufactured. The Series 0 was in service on the Tokaido Shinkansen Line until 1999 and on the Sanyo Shinkansen Line until 2008.

■ Maximum Speed: 220km/h

Car Type	21-86
Year of Manufacture	1971 (Showa 46)
Manufacturer	Kisha Seizo
Passengers Capacity	75
Total Length	25,150mm
Weight	57.6t

*This rolling stock on display is shown as it was in 1975 (Showa 50)
The interior is shown as it was in 1984 (Showa 59)

Series 0 Shinkansen (Class 36)

This restaurant car was introduced in 1975 when Shinkansen Line was extended to Hakata in Kyushu. JNR decided to introduce a restaurant car since travel time had been lengthened as a result of the extension. 99 Class 36 were manufactured and used until 1999. ■ Maximum Speed: 220km/h

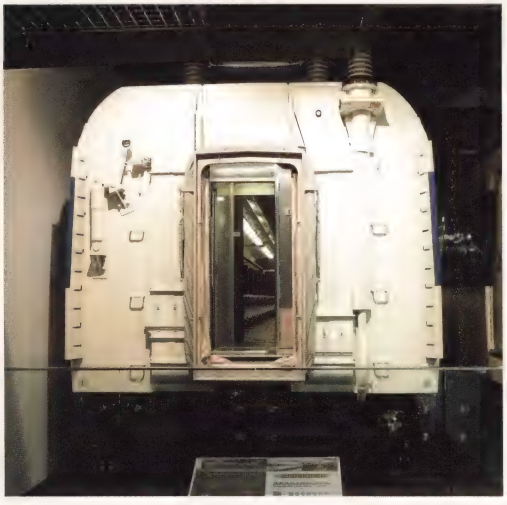
Interior prior to the installation of windows on the opposite side (windows were installed on both sides of all dining cars starting in 1979)

Car Type	36-84
Year of Manufacture	1975 (Showa 50)
Manufacturer	Hitachi
Passengers Capacity	42
Total Length	25,000mm
Weight	56.6t

Series 0 Shinkansen (Class 16)

This was the green car (1st class car) of the Series 0 Shinkansen. The seat arrangement was 2x2 while a 2x3 arrangement was standard in normal cars. The large seats with foot rests and the carpeted floor offered passengers improved comfort. It was like a dream car.

■ Maximum Speed: 220km/h



*This rolling stock on display is shown as it was in 1986 (Showa 61)

Car Type	16-2034
Year of Manufacture	1986 (Showa 61)
Manufacturer	Nippon Sharyo
Passengers Capacity	68
Total Length	25,000mm
Weight	56.6t

Series 0 Shinkansen (Class 37)

This train was a new type of Shinkansen buffet car. When the Shinkansen Line was extended to Hakata and a dining car was introduced, the design of the buffet car was changed. All the seats were removed and a multi-purpose room and wheelchair-accessible toilet was added. ■ Maximum Speed: 220km/h

*This rolling stock on display is shown as it was in 1983 (Showa 58)

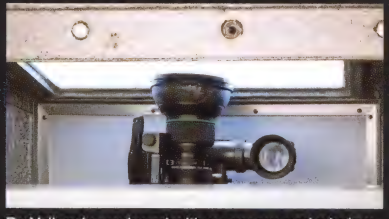
Car Type	37-2523
Year of Manufacture	1983 (Showa 58)
Manufacturer	Hitachi
Passengers Capacity	38
Total Length	25,000mm
Weight	57.5t

*This rolling stock on display is shown as it was in 2005 (Heisei 17)

Dr. Yellow (Class 922 Multipurpose Inspection Train)

This train was introduced to check overhead lines, signaling and rails while running at high speeds. It was manufactured based on the Series 0 to enable it to perform inspections at the same operational speed as the Shinkansen and contains a lot of measuring equipment. It was named Dr. Yellow because of its color. This car was used as car No.7 in a seven car train set.

■ Maximum Speed: 210km/h



Dr. Yellow is equipped with a camera and window for taking measurements on catenary wires.

Car Type	922-26
Year of Manufacture	1979 (Showa 54)
Manufacturer	Hitachi
Passengers Capacity	-
Total Length	25,150mm
Weight	59.0t

This rolling stock is owned by JR West

*This rolling stock on display is shown as it was in 1998 (Heisei 10)

Series 100 Shinkansen (Class 123)

This train is the leading car of the Series 100 Shinkansen, which succeeded the Series 0. This 2nd generation Shinkansen was a full model change that improved comfort compared to the Series 0. 1,056 cars were manufactured in total.

■ Maximum Speed: 220km/h

Car Type	123-1
Year of Manufacture	1986 (Showa 61)
Manufacturer	Hitachi
Passengers Capacity	65
Total Length	26,050mm
Weight	49.0t

*This rolling stock on display is shown as it was in 1997 (Heisei 9)

Series 100 Shinkansen (Class 168)

This is a double-decker car that was used as the dining car of the Series 100.
The first floor contains the kitchen and the second floor contains the restaurant with the big windows. The double-decker restaurant car became very popular and many people chose to ride this train for the purpose of enjoying the restaurant car. ■ Maximum Speed: 220km/h

Car Type	168-9001
Year of Manufacture	1985 (Showa 60)
Manufacturer	Kinki Sharyo
Passengers Capacity	44
Total Length	25,000mm
Weight	56.6t

*This rolling stock on display is shown as it was in 2003 (Heisei 15)

Series 300 Shinkansen (Class 322)

This is the leading car of the prototype Series 300, which is the 3rd generation Tokaido Shinkansen. It was developed to achieve 270km/h operation using cutting-edge technologies to reduce the weight, such as an aluminum alloy body and compact AC motors. As a result, energy efficiency and speed were dramatically improved. ■ Maximum Speed: 270km/h

This Series 300 prototype differs from ordinary Series 300 trains in the seat and window panel design.

Car Type	322-9001
Year of Manufacture	1990 (Heisei 2)
Manufacturer	Hitachi
Passengers Capacity	75
Total Length	26,050mm
Weight	40.9t

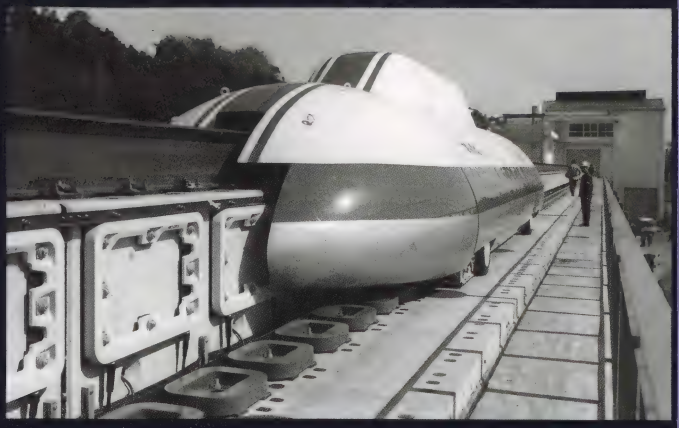
*This rolling stock on display is shown as it was in 2007 (Heisei 19)

Series 300 Shinkansen (Class 323)

This is the leading car of the Series 300, the 3rd generation Tokaido Shinkansen, which was manufactured for Nozomi Super Express operation.
The design was slightly changed from the proto type. 960 Series 300 were produced in total.

■ Maximum Speed: 270km/h

Car Type	323-20
Year of Manufacture	1993 (Heisei 5)
Manufacturer	Nippon Sharyo
Passengers Capacity	65
Total Length	26,050mm
Weight	40.7t

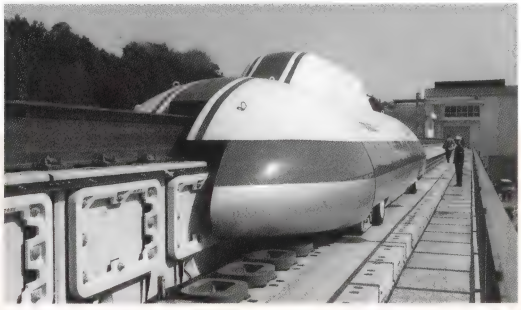


SCMAGLEV and Railway Park

The History of Superconducting Maglev Development

~Looking back on the development of the railway of the future~

This ML-100 was used by the Railway Technical Research Institute for testing



Full-fledged testing began at the Miyazaki Maglev Test Center

By using magnetic force to levitate, the Superconducting Maglev is capable of operating at high-speeds that are impossible for conventional railway rolling stock due to the absence of friction generated between the pantograph and the catenary wires, as well as between the wheels and rails. The principles behind Superconducting Maglev, which has gained attention as a next-generation railway, are as follows.

When some types of metals and alloy oxides are cooled below a certain temperature they lose all electrical resistance. This is called the "phenomenon of superconductivity". When an electrical current is passed through coils that have become superconductors (superconducting coils) this current will flow forever thereby becoming a strong magnet (superconducting magnet). The body of the Maglev levitates and is propelled forward by the attractive and repulsive forces generated between superconducting magnets installed on the car body and coils on the ground; this is the principle of Superconducting Maglev.

Research on linear motor-propelled levitating railway began in 1962 (Showa 37). It was in 1972 (Showa 47) that levitated running was first achieved. In 1977 (Showa 52) a test line was constructed in Miyazaki Prefecture. From then research progressed smoothly, a fact that can be illustrated by successful operation at a speed of 517km/h in 1979 (Showa 54).

Running tests and technological development began at the Yamanashi Maglev Test Line in 1997 (Heisei 9). Since then many tests have been successfully concluded. In November 2003 (Heisei 15) a continuous running test was implemented during which the Superconducting Maglev ran for 2,876km, which is the longest continuous distance it had ever been run in one day. During maximum speed improvement tests in December 2003 a speed of 581km/h was recorded. This is still the fastest

A 2-car MLU-001 trainset

Inauguration of the Yamanashi Maglev Test Line in 1997

The MLX01 on the Yamanashi Maglev Test Line

speed ever recorded by railway and is in the Guinness Book of World Records.

The results of these running tests and technological developments have been evaluated at every stage by the Ministry of Land, Infrastructure, Transport, and Tourism's Maglev Technological Practicality Evaluation Committee. In July 2009 (Heisei 21) the Committee stated in regards to superconducting magnetically levitated railway that, "the technology needed for a commercial line has been comprehensively and systematically prepared and it is now possible to move forward with actual creation of detailed commercial line specifications and technical standards".

JR Central plans to use superconducting maglev technology, which has already reached a level that will not impede commercial operation, to realize the Chuo Shinkansen.

A relative speed of 1,026km/h was recorded in 2004 during passing tests

■ History Timeline of Superconducting Maglev

1962 (Showa 37)
Research on linear motor propelled levitating railway begins

March 1972 (Showa 47)
The LSM200 succeeds in magnetically levitated operation for the first time

December 1977 (Showa 52)
Miyazaki Maglev Test Center opens

December 1979 (Showa 54)
The ML500 records a speed of 517km/h during unmanned running at the Miyazaki Maglev Test Center

1987 (Showa 62)
The MLU-001 records a speed of 400.8km/h during unmanned running at the Miyazaki Maglev Test Center

November 1990 (Heisei 2)
Construction begins on the Yamanashi Maglev Test Line

July 1995 (Heisei 7)
The MLX01 rolling stock for the Yamanashi Maglev Test Line is completed

January 1996 (Heisei 8)
Running tests conclude at the Miyazaki Maglev Test Center

1997 (Heisei 9)
March: 18.4km of Yamanashi Maglev Test Line completed
April 30: Running tests begin at Yamanashi Maglev Test Line
May 30: Levitated running achieved
November 28: Commercial speed goal of 500km/h recorded
December 24: Designed maximum speed of 550km/h recorded

1999 (Heisei 11)
April 14: A speed of 552km/h recorded during manned running
November 16: Passing tests at a commercial operation speed of 500km/h conducted resulting in a relative speed during passing of 1,003km/h.

December 2, 2003 (Heisei 15)
The MLX01 sets the world railway speed record of 581km/h

November 16, 2004 (Heisei 16)
Passing at a relative speed of 1,026km/h implemented.

Greatest Railway Diorama Room

The scale of this railway model is 1/80~1/87 and 16.5mm wide HO gauge tracks are used. This is the most expansive large-scale diorama in the world.

The theme of this diorama is "A Day in the life of Railway". The rail side scenery of the Tokaido Shinkansen has been meticulously reproduced to create scenes that are bursting with life. Amidst the scenery you can see models of JR Central's most historic rolling stock, such as the Superconducting Maglev, the Series N700 Shinkansen, and conventional lines, moving about. Of course you can see commuter trains during morning and evening rush hour, as well as limited express trains that bid us to go sightseeing. Children and adults alike will enjoy just watching the diorama and will be reminded of just how indispensable railway is to our lives through the various scenes played out within this beautiful model.

In the center of this diorama is a reproduction of Nagoya City. Tokyo is reproduced on the observer's right while Osaka is on the left, and HO gauge Series N700 and Series 700 travel between Tokyo, Nagoya and Osaka, just like in real life!

Some of the engineering structures in the diorama are perfect reproductions of the real things. Structures like the Nagoya Station Building, JR Central Hamamatsu Workshop where Shinkansen rolling stock is inspected and maintained, JR Central Towers, and the main hall of Todaiji Temple in Nara have all been faithfully reproduced and are larger-than-life. There are also tons of moving objects, like the Ferris wheel, as well as fun surprises hidden within the diorama that will make you gasp in excitement. Don't forget to look for all the neat things when you visit the diorama!

Be sure to get up close to the model rolling stock that run within the landscape of this huge diorama and enjoy it to its full extent!

Simulators

Shinkansen Train Driving Simulator

The Shinkansen Train Driving Simulator combines a life-size mock-up of the driver's cabin of the latest Tokaido Shinkansen, the Series N700, with a large, curved 10m × 3m screen. Passing scenery is displayed on the screen using computer graphics (CG) and each person is allowed a lengthy 15 minutes in the simulator during which to enjoy the experience of driving the Shinkansen. Of course people not using the simulator are allowed near the exhibit to observe and feel the thrill of the Series N700 speeding down the track at its maximum speed of 270km/h.

The driving difficulty can be set to three levels. The lowest level has a guidance function so that first-timers can enjoy the experience, and the hardest level requires users to operate the Shinkansen just like professional drivers. The simulator can also evaluate how you performed. The scenery can be changed to fit certain times of day and weather conditions, which makes this simulator exciting every time you try it.

Shinkansen Train Driving Simulator

Conventional Train Crew Simulator

Conventional Train Driving Simulator (Series 313)

Conventional Train Driving Simulator & Train Crew Simulator

The Conventional Train Driving Simulators are based on the driving training devices used at the JR Central Employee Training Center and the offices (transit sections) to which conventional line drivers and train crew are assigned. There are four Series 211 simulators and four Series 313 simulators. Both computer graphics and real images are used for the driving footage, and the time of day and weather conditions can be changed. Difficulty can be set to three levels. The lowest level has a guidance function, and the hardest level is quite involved and requires you to adhere to the operation timetable.

The Train Crew Simulator is the first of its type to be used in a museum-type facility. It is based on the Series 313 train crew training device used in conventional line transit sections. Users look at the footage on the large monitor to open and close the doors at stations upon confirming safety and giving train announcements between stations. This simulator also has three different difficulty levels. As the difficulty increases the number of passengers getting on and off at each station increases and events that differ from normal occur thereby making it more difficult to time the opening and the closing of the doors.

Railway System Learning Zone

The "Railway System Learning Zone" explains the history of evolution of high-speed railway with a focus on the Shinkansen that epitomizes modern railway, as well as everything that goes into maintaining safety, high-speed and comfort in an easy-to-understand manner using models as well as the real thing.

Displays include "A Day in the life of the Shinkansen" and "The Life of the Shinkansen", as well as separate sections that explain about "Safety", "Speed", "Riding Comfort", "Ticketing" and "The Environment".

"A Day in the life of the Shinkansen" introduces you to the people behind the Shinkansen that ensure safe and reliable transport during an entire day from the first to the last departure, while "The Life of the Shinkansen" introduces you to the life cycle of rolling stock from design to retirement. The "Safety" exhibit explains the basics behind systems such as CTC and ATC, and the "Speed" exhibit introduces advancements in technology by comparing old and new Shinkansen parts, such as pantographs and bogies. The seats exhibit shows the transformations that seats have undergone, while the "Ticketing" exhibit explains the transformations that train ticketing terminals and automatic ticketing gates have undergone. Finally, "The Environment" exhibit introduces the attributes of railway that enable it to ease the burden put on the global environment.

By learning about each aspect of advanced modern railway, visitors will be able to more readily understand the advancements made in high-speed railway technology.

Superconducting Maglev Room

The "Superconducting Maglev Room" explains in an easy-to-understand manner the workings and safety aspects of the Superconducting Maglev, which uses the phenomenon of superconductivity, a world-class Japanese technology.

In the theater, which is designed to look like the cabin of the Superconducting Maglev, visitors can experience riding the Maglev on the Yamanashi Maglev Test Line with CG (computer graphics) footage.

The exhibit also uses models and CG videos to answer questions such as, "how does it move?", "why does it levitate?".

This exhibit will enable visitors to deepen their knowledge of Superconducting Maglev technology in a "fun" and "easy-to-understand" manner.

Railway History Room

Railway History Room / Relics Room

The "Railway History Room" introduces the history of Japan's railway, such as advancements made in railway transportation, with an emphasis on the Tokaido, which has continued to function as a major transportation artery that links eastern Japan to western Japan.

Japan's railway began with the opening of a railway in 1872 (Meiji 5) that connected Shimbashi (old station) to Yokohama (currently Sakuragi-cho), and the whole Tokaido Line was opened in 1889 (Meiji 22). This event sparked the transformation of Japan into a modern society.

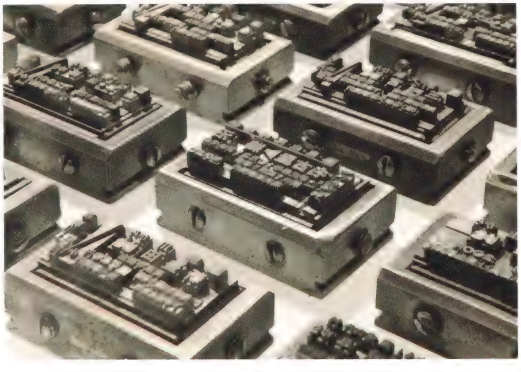
The main exhibit in the Railway History Room introduces railway history based on the Tokaido Line from railway pre-history until the present day. There are also three other exhibits entitled "The Tokaido Story" that introduces the development of the Tokaido; "The Birth of the Shinkansen" that introduces the birth of the Tokaido Shinkansen, the history behind it, Tokaido Shinkansen project over-

Relics Room

views and its development; and, "Stations and Urban Development" that introduces the relationship between stations and urban development. This exhibit uses models and actual historical documents to explain in an easy-to-understand manner from economic, cultural and social aspects how railway has impacted society.

When the Tokaido Shinkansen opened it took 19 hours to travel between Shimbashi and Osaka. Now, on the Series N700, the main driving force behind the Tokaido Shinkansen, it takes 2 hours and 25 minutes to travel between Tokyo and Shin-Osaka. That's approximately 1/8 the time of what it was before. You can see that development of the Tokaido Main Line has gone hand-in-hand with the development of Japan's society and economy.

The "Relics Room" exhibits many valuable historical documents and objects, such as old tools and equipment that JR Central has kept locked away. Some of these objects may bring back memories of the railway of old. This exhibit exemplifies the saying "learning from the past".



Learning & Experiencing Room / Theater

In the "Learning & Experiencing Room" visitors can use models to enjoy learning about how the laws of physics that you learned in school as a child are applied to the world of railway.

Operating the models will allow you to understand what roles "friction" and "centrifugal force" play in railway, and learn how the mechanism for opening rolling stock doors works.

The "Theater" seats 55 people and is compatible with Hi-Vision video. Visitors can learn about the technology and history of railway through various videos. In addition to special exhibits and videos for each season, visitors can also take part in lectures and talks.

Visitor Information

■ Opening Hours: 10:00~17:30
(Last admission 30 minutes before closing)

■ Holidays: Closed on Tuesdays
(When a National Holiday falls on a Tuesday, the museum will be closed on the following day)
During the New Years' holiday from Dec 28th to Jan 1st
* Calendar showing closed dates is available on the official website.

■ Admission Fee:

Adult	1,000yen (800yen)
School child	500yen (400yen)
Child (Age Over 2)	200yen (100yen)

* Prices in parentheses are rates for groups of over 20 people
* Physically challenged visitors
500yen (over age 18), 200yen (under 18)
(One accompanying guest may enter for the same fee)

■ Train Simulator Fee:

Shinkansen Train Driving Simulator	500yen per 1 time
Conventional Train Driving Simulator	100yen per 1 time
Conventional Train Crew Simulator	500yen per 1 time

■ Audio Guide Rental Fee: 500yen per tour
Our audio guides are touch panel operated and will explain using voise and images about the museum and the exhibits it holds. Push button type audio guides are also available for the visually impaired. (Audio guides are available in the following languages: Japanese, English, Chinese, Korean, French, German, Spanish, and Portuguese)

■ Location: 3-2-2 Kinjofuto, Minato-ku, Nagoya, Aichi, 455-0848, Japan

■ Access: Two minute walk from Kinjofuto Station on the Aonami Line from Nagoya Station.
(It takes 24 minutes one way from Nagoya Station to Kinjofuto Station)

Photography/Historical Documents	Railway Technical Research Institute, Toshiro Hibino, Hiroyuki Miyata, Takashi Maesato, Seiichi Okada, Masato Yamaguchi, Manabu Kekke, Tomonori Otsuru Nagoya Rail Archives (NPO), Kotsu Shimbunsha
Courtesy of	Kotsu Shimbunsha

SCMAGLEV and Railway Park OFFICIAL GUIDEBOOK

Issued on August 2, 2011

Price:	1200yen(excl.tax)
Editing:	Central Japan Railway Company, SCMAGLEV and Railway Park
Issued & Sold by:	Kotsu Shimbunsha
Printing:	Takeda Printing Co., Ltd.

SCMAGLEV and Railway Park

Price : 1200yen(excl.tax)

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